

REMARKS

Reconsideration of the above-referenced application in view of the amendments and the following remarks is respectfully requested.

Claims 1-11 were pending in this case. Non-elected Claims 12-17 have been cancelled. New Claims 18-26 have been added. Claims 8 and 11 have been amended.

Claims 8 and 11 stand rejected under 35 U.S.C. 112, second paragraph. Claims 8 and 11 were amended in response to the rejection to correct clerical errors.

Claims 1, 2, and 4-6 stand rejected under 35 U.S.C. 102(b) as being anticipated by Johnson (U.S. Patent No. 5,888,849). Applicant respectfully traverses the rejection.

Claim 1 is to a "reel-to-reel tape." Johnson includes the statement "[t]he stiffener makes it possible to handle the flexible film in strips, rolls or small panels" (col. 3, line 5), but does not disclose a reel-to-reel tape. Claim 1 includes the feature of "a chip mount pad, secured to said first surface, coplanar with said second surface." Johnson does not disclose such a chip mount pad. Note that element 10 in Johnson's Figure 6 is a lead, not a mount pad, which is likely the reason that Johnson must rely upon encapsulant 16 for support.

Claim 2 is also to a reel-to-reel tape. As noted above, Johnson does not disclose a reel-to-reel tape. Claim 2 includes the feature of "a chip mount pad in each of said second openings, attached to said first surface and shaped to be coplanar with said second surface." Johnson does not disclose such a chip mount pad. As mentioned above, element 10 in Johnson's Figure 6 is a lead, not a mount pad.

Claim 4 includes the feature "wherein said routing lines and contact lands are created by a photolithographic patterning and chemical etch process."

Johnson does not disclose how his circuitry 2 is formed on dielectric 1. Note also that product-by-process Claim 4 depends from Claim 2, which is patentable over Johnson for the reasons presented above.

Claim 5 includes the feature "wherein said bending of said chip mount pad is provided by a mechanical coining process." Johnson does not disclose a coining process. Note also that product-by-process Claim 5 depends from Claim 2, which is patentable over Johnson for the reasons presented above.

Claim 6 includes the feature "wherein said first and second openings are created by a mechanical punching process." Johnson does not disclose a punching process. Note also that product-by-process Claim 6 depends from Claim 2, which is patentable over Johnson for the reasons presented above.

Claim 3 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson in view of Ikegami (U.S. Patent No. 6,194,781). Applicant respectfully traverses the rejection. Claim 3 depends from Claim 2. As pointed out above, Johnson fails to disclose a chip mount pad as described in Claim 2. Johnson also fails to suggest such a pad. Ikegami does not cure this deficiency of Johnson. Therefore, Applicant submits that Claim 3 is patentable over the cited references.

Claim 7 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson in view of Nakashima, et al. (U.S. Patent No. 5,075,760). Applicant respectfully traverses the rejection. Claim 7 includes the feature of "a portion of said first surface covered with an adhesive layer." Johnson at col. 3, line 6 includes the statement "... the use of the molded stiffener directly onto the flexible thin film avoids the necessity of an adhesive composition." Thus, Johnson teaches away from a combination with Nakashima's adhesive layer. Furthermore, Claim 7 includes the feature of "a copper foil laminated on said adhesive layer; portions of said copper foil in said second openings mechanically shaped into a position coplanar with said second surface, for use as chip mount pads." As mentioned above, Johnson does not teach or suggest such a chip

mount pad. Nakashima does not cure that deficiency of Johnson. Therefore, Applicant respectfully submits that Claim 7 is patentable over the cited references.

Claims 8-11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson in view of Freyman, et al. (U.S. Patent No. 6,124,637). Applicant respectfully traverses the rejection. Claim 8 includes the feature "a chip mount pad in each of said second openings, attached to said first surface and shaped to be coplanar with said second surface." As indicated above, Johnson does not teach or suggest such a feature. Freyman does not cure that deficiency of Johnson. Applicant also submits that the skilled artisan would have no motivation to combine Freyman's teaching of wire bonding with the structure disclosed by Johnson in Figure 6. As noted above, element 10 in Johnson is a lead, not a chip mount pad. Therefore, there is no need for wire bonding in the structure of Figure 6, since the connections are made by leads 10. Note further that Johnson teaches wire bonding in Figure 5, but teaches that integrated circuit 6 is mounted on substrate 1, not on a chip mount pad as described in Claim 8. There is nothing in Johnson to suggest that the wire bonding of Figure 5 could be applied to the structure of Figure 6.

Claim 9 includes the feature wherein "said chip mount pads, coplanar with said second tape surface, provide a direct thermal path to said circuit chips." Claim 10 includes the feature wherein "said chip mount pads serve as heat convection surface for said circuit chips." As noted above, element 10 in Johnson's Figure 6 is a lead, not a chip mount pad. Note further that Johnson's lead 10 and chip 6 are encased in encapsulant 16, which would be an impediment to dissipation of thermal energy. Claim 11 depends from Claim 8, and is therefore patentable over the references of record for the reasons presented above for that claim.

New Claims 18 to 26 include features cited in Claims 1-11 as not being taught or suggested by the references of record. Applicant therefore submits

that these new claims are patentable and requests that the claims to be passed to issuance with Claims 1-11.

Applicant respectfully requests reconsideration and withdrawal of the rejections and allowance of Claims 1-11 and 18-26. If the Examiner has any questions or other correspondence regarding this application, Applicant requests that the Examiner contact Applicants' attorney at the below listed telephone number and address.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims:

8. (amended) A low profile, high power semiconductor device including a plastic tape having first and second surfaces, comprising:

a plurality of electrically conductive routing lines and a plurality of contact lands on said first surface, said lands exposed by first openings in said tape;

second openings in said tape configured to accommodate integrated circuit [accomodate said] chips;

a chip mount pad in each of said second openings, attached to said first surface and shaped to be coplanar with said second surface;

a circuit chip mounted by means of a thermally conductive material on each of said chip mount pads;

bonding wires connecting said chip to said contact lands;

encapsulating material surrounding said first tape surface including each of said mounted chips and said wire bonds; and

solder balls attached to each of said exposed lands.

11. (amended) The semiconductor device according to Claim 8 wherein said device [package] is created by a transfer molding process of molding compounds, thereby providing mechanical rigidity to said device even when the device thickness is kept to a low profile.